

## OPERATIONS SCENARIO

### MONITORING-BASED, FLEXIBLE OPERATIONS EMPHASIS

#### Assumptions

1. The significance (biological importance) of "take" at the CVP/SWP facilities can only be evaluated if the overall population/distribution (preferable) or density/distribution (interim goal) of key (target) species is known or can be estimated with reasonable accuracy contemporaneously with the "take". Likewise, the risk of "take" of key species can only be assessed in light of these parameters. Changes in facility operations will be made by comparing adult equivalent "take" or the risk of such "take" at the facilities to contemporaneous population estimates (not "indices") based on a systematic sampling of the target species populations throughout their range and across all potential habitats within that range.
2. The VAMP experiment will be conducted, within its original scope (31 days with flexible timing in a 90-day window).
3. The Accord will remain in place for seven more years.
4. The VAMP experiment shall not be considered for use as a regulatory tool until the experiment has been completed.
5. E/I ratios will be phased out within the remaining life of the Accord, with emphasis on early phase-out.
6. The X2 standard will become flexible within the life of the Accord in order to optimize flexible operations and will be relaxed as factors for which X2 is an intended surrogate are identified through an aggressive program and expeditiously factored into system management.
7. There will be an evolution toward "floating average" (*e.g.* 14-day average) targets for all "average condition" parameters to eliminate large, sudden operations changes in order to meet monthly average targets, thus removing an unnecessary source of risk for aquatic species.

#### Elements

1. Flexible operations to reduce aquatic resource entrainment mortality and identifiable indirect mortality associated with the projects, including:
  - Salvage will be monitored on a real-time basis, as one operations trigger. This trigger will be implemented to either increase or decrease exports on a near-real-time basis in order to minimize losses of key species. The effects of implementation of this trigger can be modeled using either the method developed by Peter Louie (rising or falling density

function in the salvage data) or the method developed by Russ Brown (curtail operations to produce a target mortality or less).

- Aggressive cross-habitat, community-based, near-real-time biological monitoring (see below) will be conducted for "early warning" and a second operations trigger. This trigger will be implemented preemptively to a) reduce the risk of eventual entrainment and consequent mortality; b) reduce the probability of project-induced distribution of key species into the south delta. Implementation of this trigger will be through real-time PTM feedback to operations. For the purposes of evaluation, maximum risk levels should be assigned to various life stages of key species (to achieve rough adult-equivalent or population impact results) and the projects operated to achieve less than the maximum risk levels. For example, by assigning a 7.5% risk level for juvenile delta smelt, projects could be operated so that there would be a 25% chance of 30% of the "particles" showing up at the pumps within, say, 20 days. This operations mode would be forced to take inflows of all major tributaries into the delta individually into account as well as tidal hydrodynamics. PTM analysis could follow water mass movement from "injection points" at Rio Vista, head of Georgiana Slough, Jersey Point, the mouth of the Mokelumne River, Columbia Cut, Turner Cut, Vernallis and Old River at Bacon Island.

For discussion and initial evaluation purposes, the following risk levels are proposed for key species:

|                             |     |
|-----------------------------|-----|
| ➤ Juvenile delta smelt      | 10% |
| ➤ Adult delta smelt         | 15% |
| ➤ Winter run chinook *      | 20% |
| ➤ San Joaquin chinook       | 30% |
| ➤ All other chinook smolts* | 35% |
| ➤ New-arrival chinook fry*  | 15% |
| ➤ Post-larval striped bass  | 40% |

\* Based on estimated percent of population entering the delta

The risk level for adult delta smelt is based in part on the assumption of an upstream migration behavior for this life stage, while recognizing that south delta spawning appears to occur at an elevated rate following dry and critical years. The "risk" levels for salmon are much higher than the actual anticipated protection levels, since salmon smolts have migratory behaviors which tend to strongly mitigate risks calculated from real-time PTM results. San Joaquin chinook smolt protection is assumed to be primarily a function of closure of the HOR Barrier and operation curtailment based on salvage monitoring, coupled with migratory behavior for those individuals which move down the San Joaquin

mainstem as far as Turner Cut. The analysis of remote monitoring and salvage monitoring may indicate the need for a significant adjustment in this risk level.

It is not clear whether these targets can be reasonably met, since they have not yet been modeled. Water export losses would be made up through elimination of E/I ratios (except as required during specific VAMP experiments) and relaxation of X2 to Collinsville (on a floating average basis; see Assumption 7).

- Percent-of-population adult equivalence (all target species) will be used for "take" and for "in harm's way" estimates as feedback to operations.
  - Joint Point of Diversion (plus intertie) will be used as part of flexible operations.
  - Flexible operations will be integrated with Head of Old River Barrier operations (normally closed) and Cross-Channel Gate operations (opened only when necessary for water quality) using the aggressive monitoring tool.
  - During the remaining life of the Accord (or until earlier abandonment), the X2 standard will be relaxed to Collinsville whenever warranted by both biological monitoring and water supply needs in order to take advantage of delta channel storage and to avoid adverse impacts on reservoir storage and carryover. Greater relaxation may be phased in as factors for which X2 is an intended surrogate are identified and factored into system management.
  - Until abandonment within the remaining life of the Accord, E/I constraints will be eliminated except as necessary for specific VAMP experiments.
2. A "no degradation" policy shall be implemented for CCWD, including chloride standards at Los Vaceros, Rock Slough and Antioch with the following elements as operational guidelines:
- 250 ppm chloride year-round at Rock Slough, with 155 - 240 days per year at 150 ppm chloride at either Rock Slough or Antioch, depending on the water year type.
  - 50 ppm chloride at Los Vaceros for sufficient time to fill the reservoir.
  - Alternatively, if water costs are significant, alternative "plumbing" (*e.g.* into the SWP) will be investigated to protect water quality for CCWD.
3. An extensive across-habitat, community-based biological monitoring and research program (incorporated into CMARP) will be implemented.

➤ Purposes:

1. Near-real-time data will be used as feedback to Flexible Operations(see above).
2. Organism/habitat and community/habitat relationships and interactions will be determined, along with population distributions and seasonal changes. Information will be used to advance physical habitat rehabilitation and to modify Flexible Operations rationales.
3. The influences of toxics and exotics on biological communities and distribution and abundance of native species will be determined and actions implemented to reduce or eliminate identified risks to aquatic biota.
4. Responses of organisms, populations and communities to real-tide hydrodynamics and interactions with physical habitat characteristics will be determined, along with changes in these relationships. Information will be used to advance habitat rehabilitation in the hydraulic geometry arena and feed into Flexible Operations rationales.
5. This monitoring program will replace existing monitoring programs with focused, rigorously designed investigations specifically designed to determine actual population levels, distributions and ecological relationships of target organisms.
6. Reliance on average-condition surrogates such as X2, E/I, Q-West, Delta outflow, etc. as regulatory standards will be expeditiously phased out. Factors for which X2 is an intended surrogate will be identified through this aggressive, focused program and expeditiously factored into system management as appropriate.

➤ Characteristics:

- Sampling and data analysis methods will be "best available" and be designed to specifically address parameters/species/processes under investigation.
- Experimental design will call for cross-habitat and community based sampling and data analysis protocols.
- All feasible steps will be taken to calibrate or "index" new sampling and data analysis protocols to historical databases in order to address the issue of database continuity.
- There will be full stakeholder participation in design and execution

4. Enthusiastic agency and environmental group support for water transfers, storage and water banking (tied to the "Environmental Water Account") will be an important element in this scenario.

### **Additional elements**

The following elements are not strictly "operations" elements, but are included to balance the package:

1. Implement increased conveyance channel capacity in the South Delta (Old River, etc.) in order to facilitate operations flexibility.
2. Establish "interceptor" habitat along major conveyance channels (gradual build-out).
3. Unless specifically contra-indicated on a local basis by peer-reviewed studies, implement aggressive, focused predator removal (transfer) programs at the following target locations:
  - Within CCFB until screened, then in front of CCFB
  - In front of Tracy
  - Below Woodbridge Dam
  - Seek out and include other areas of extraordinary predator concentrations, especially along migration routes.
4. The habitat program defined so far is only the beginning; additional elements should have the following results:
  - Significant increase in water residence time within the delta
  - Additional large areas of gently sloping, vegetated intertidal habitats with distributary channels
  - Significant increases in "edge" habitat (increased edge/area ratio)
  - Other major elements which become identified during Phase I